



State of Utah

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DIVISION OF WASTE MANAGEMENT
AND RADIATION CONTROL
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June 13, 2018

Vern C. Rogers, Manager
Permitting and Compliance
EnergySolutions LLC
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Salt Lake City, Utah 84111

RE: Response to April 2, 2018 Correspondence

Dear Mr. Rogers:

This letter is in response to Amanda Smith's letter to me dated April 2, 2018 regarding my letter addressed to you dated August 9, 2017 and the legal basis for the requirement for the United States Department of Energy (DOE) to enter into a Tri-Party Agreement with EnergySolutions and the State of Utah regarding land transfer and long-term stewardship of large quantities of concentrated depleted uranium wastes proposed for disposal at the Clive Facility.

The Division does not agree with Ms. Smith's argument that the Tri-Party Agreement "is not properly part of the Safety Evaluation Report (SER) for the Depleted Uranium Performance Assessment (DUPA) and should not be conflated with the approval of the DUPA." As explained in more detail below, the requirement for a legally-binding Tri-Party Agreement with the DOE is not simply a policy matter that should be separated from the SER. Rather, it is firmly grounded in, and required by, the Radiation Control Rules.

The first condition set forth in the draft 2015 SER stated that any Director approval would require a legally-enforceable agreement among EnergySolutions, the State of Utah and the DOE relating to long-term stewardship of the DOE's concentrated depleted uranium proposed for disposal at the Clive Facility. This requirement has been known by EnergySolutions to be an important issue for the State of Utah dating back to meetings that were conducted in 2013.

There appears to be a fundamental disagreement as to the purpose of the DUPA and the SER. The express purpose of the SER is to assist me in determining whether the proposed disposal of large quantities of concentrated depleted uranium can be accomplished in compliance with the Radiation Control Rules. As stated in the draft 2015 SER:

The purpose of this Safety Evaluation Report (SER) is to determine the extent to which the depleted uranium performance assessment (DU PA) submitted by EnergySolutions, LLC

DRC-2018-005386

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(EnergySolutions) on June 1, 2011 (Neptune 2011), and revised on June 5, 2014 (Neptune 2014a), *complies with the requirements of Utah Administrative Code (UAC) R313-25-9(5)(a) and other relevant regulations.*

Safety Evaluation Report (2015) at ES-1 (emphasis added).

The anticipated revised SER will apply the same standard as the 2015 SER: Does EnergySolutions' proposal to dispose of significant quantities of DOE-generated and owned concentrated depleted uranium at Clive (private property) comply with the Radiation Control Rules? Rather than being a conflation of issues, as Ms. Smith contends, the requirement for a legally-binding Tri-Party Agreement goes to the heart of the legal and technical requirements under the Radiation Control Rules. To be sure, compliance with these rules not only involves technical issues, such as evaluation of public dose and protection of groundwater, but more policy-related matters such as financial assurance and long-term stewardship. Nevertheless, the policy-related issues, especially long-term stewardship of depleted uranium, are indivisible from the other requirements in the rules. These are all legal requirements that have been known to EnergySolutions from the outset of this process. All requirements set forth in the rules must be satisfied. Following is a discussion of the specific rules that relate to the Tri-Party Agreement requirement, followed by discussion of related matters that deserve attention at this time.

I. TRI-PARTY AGREEMENT – GOVERNMENTAL CUSTODIAL AGENCY.

The legal basis for this requirement arises from several interrelated considerations under the Radiation Control Rules. As an initial matter, under both the Utah and United States Nuclear Regulatory Commission (NRC) rules, it is anticipated that disposal of radioactive materials will occur only on governmentally-owned property and that, following the institutional care period of 100 years, the disposal facility will be transferred to a governmental custodial agency for long-term care and maintenance. As you know, in the 1990s, EnergySolutions' predecessor obtained a variance from the former Radiation Control Board (RCB) as to disposal of Class A waste on private property. This variance is addressed in my August 9, 2017 letter. One of the important outstanding issues with this variance is that there is no provision for transfer of the disposal facility to a governmental custodial agency for long-term care and maintenance. As to commercial Class A waste, this variance apparently made sense to the former RCB because of (a) the existence of adequate institutional controls and (b) the existence of adequate funding for the institutional control period (the first 100 years after closure).

The problem is that, as to long-term stewardship issues, depleted uranium is radiologically distinguishable from the types of conventional, commercial Class A wastes that were on the market during the 1990s. The NRC has discussed in a number of its reports how depleted uranium behaves differently from commercial Class A waste and how it needs to be treated as a unique waste stream. Some examples of NRC statements follow:

Depleted uranium has some characteristics that are dissimilar from commercial LLW.

- A large percentage of the activity is associated with very long-lived radionuclides.
- Radioactive decay results in increasing hazard with time until after 1 million years, as a result of increasing concentrations (and higher mobility) of decay products.
- In-growth of significant quantities of a daughter in gaseous form (222Rn)

(NRC, SECY-2008-0147, Enclosure 1, Pages i and ii)

The waste concentration limits in 10 CFR 61.55 may not be adequately protective for certain waste streams containing long-lived radionuclides that are classified as Class A by default because concentration limits were not developed (e.g., depleted uranium) for those long-lived radionuclides.

(NRC, 2016, Guidance for Conducting Technical Analyses for 10 CFR Part 61 DRAFT Final Report, Pages F-36, F-37; see also F-62.)

A more detailed synopsis of NRC statements regarding depleted uranium and how it behaves differently than other types of Class A waste is provided in Attachment A. The radiological differences between concentrated depleted uranium and commercial Class A waste is also quite graphically illustrated in the following NRC slide:¹

Background: DU Characteristics

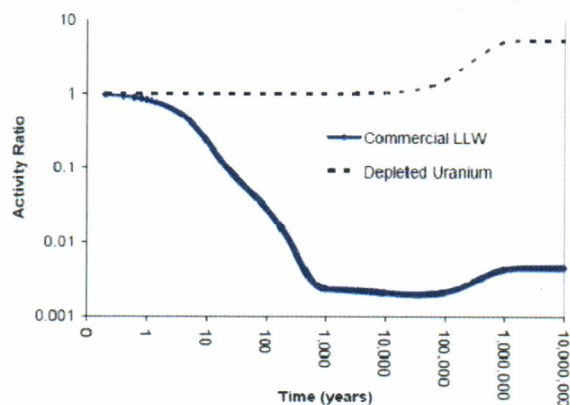


Figure 1 Activity Ratios of DU and a Commercial LLW Facility. The activity ratios are defined as the initial activity to the activity at various points in time.

The NRC did not consider, at least publicly, the disposal of large quantities of concentrated depleted uranium (e.g., as from DOE facilities in the Midwest, or from the non-government URENCO facility in New Mexico) in a private, commercial facility until the mid-2000s. For this reason, at the time that the former RCB granted the private property exemption, it was not anticipated that the DOE would be attempting to use private, commercial disposal services for its concentrated depleted uranium. The former RCB could not have known at the time what decisions the NRC would make later on allowing or disallowing the disposition

¹ This slide is part of an NRC-produced PowerPoint presentation published online at:
<https://www.nrc.gov/docs/ML1018/ML101800128.pdf>

of large quantities of concentrated depleted uranium at commercial LLRW disposal facilities, or the basis for such an allowance or disallowance.

Turning to the specific issue raised in Ms. Smith's letter, the legal basis for the requirement for a legally-binding agreement from the DOE to take responsibility for long-term care of the disposal facility is to ensure compliance with the Radiation Control Rules. More specifically, such an agreement will ensure that the United States government will fill the role of the custodial agency for the disposed depleted uranium wastes following the 100-year institutional care period. Because the depleted uranium will have been disposed of on private property, unless the agreement is legally binding, there is a risk that the long-term responsibility for depleted uranium will fall to Utah taxpayers. This conclusion is driven by the clear meaning of the Radiation Control Rules, as discussed below.

A primary legal basis for the Tri-Party Agreement is found in Utah Administrative Code R313-25-10. This rule relates to long-term stewardship matters:

R313-25-10. Institutional Information.

The institutional information submitted by the applicant shall include:

- (1) A certification by the federal or state agency which owns the disposal site that the agency is prepared to accept transfer of the license when the provisions of Section R313-25-17 are met and will assume responsibility for institutional control after site closure and for post-closure observation and maintenance.
- (2) *Evidence, if the proposed disposal site is on land not owned by the federal or a state government, that arrangements have been made for assumption of ownership in fee by the federal or a state agency.*

(emphasis added). A purpose of the Tri-Party Agreement is to ensure that the appropriate (e.g., legally binding) arrangements have been made for assumption of ownership in fee by the federal or state agency for the depleted uranium disposal site. Reference is further made to Utah Administrative Code R313-25-9, which provides:

R313-25-29. Institutional Requirements.

- (1) Land Ownership. Disposal of waste received from other persons may be permitted only on land owned in fee by the Federal or a State government.
- (2) Institutional Control. The land owner or custodial agency shall conduct an institutional control program to physically control access to the disposal site following transfer of control of the disposal site from the disposal site operator. The institutional control program shall also include, but not be limited to, conducting an environmental monitoring program at the disposal site, periodic surveillance, minor custodial care, and other equivalents as determined by the Director, and administration of funds to cover the costs for these activities. *The period of institutional controls will be determined by the Director, but institutional controls may not be relied upon for more than 100 years following transfer of control of the disposal site to the owner.*

(emphasis added). This rule is based on the NRC rule codified at 10 C.F.R. § 61.59. The "owner" in the highlighted language refers to the long-term governmental agency responsible for the site in perpetuity, also referred to as the "custodial agency." Given the extremely long-lived nature of the radioactivity of depleted uranium and the increasing activity of this material (ingrowth), the concern is that there is no provision in

EnergySolutions' proposal for a custodial agency to take responsibility for the facility for the post-institutional care period. While this is less of a concern for most types of Class A waste, which are expected to have reached very low activity levels after the first 100 years, the long-term activity of depleted uranium is strikingly different.

It is contrary to the rules to rely on institutional controls for more than 100 years. A significant point in the former RCB's private property variance for Class A waste at Clive and the NRC's affirmation of the Board's variance in the U.S. Ecology matter (41 N.R.C. 43 (1995)), is based on the adequacy of the institutional controls. However, it is equally clear that the Director may not rely on institutional controls for more than 100 years. The reasonable long-term care responsibilities for the proposed depleted uranium disposal site (unlike commercial Class A waste) will greatly exceed 100 years. Therefore, institutional controls cannot form the basis for long-term stewardship of concentrated depleted uranium waste.

The Radiation Control Rules also require post-closure monitoring, both during the institutional care and custodial care periods. Reference is made to the following rule:

R313-25-27. Environmental Monitoring.

(3) After the disposal site is closed, the licensee responsible for post-operational surveillance of the disposal site shall maintain a monitoring system based on the operating history and the closure and stabilization of the disposal site. The monitoring system shall be capable of providing early warning of releases of waste from the disposal site before they leave the site boundary.

(4) The licensee shall have plans for taking corrective measures if the environmental monitoring program detects migration of waste which would indicate that the performance objectives may not be met.

Based on these requirements, there must also be adequate financial assurance to cover the anticipated costs of monitoring and care not only during the institutional care period but also during the custodial care period. Reference is made to the following rules:

R313-25-31. Funding for Disposal Site Closure and Stabilization.

(1) The applicant shall provide assurances prior to the commencement of operations that sufficient funds will be available to carry out disposal site closure and stabilization, including:

- (a) decontamination or dismantlement of land disposal facility structures, and
- (b) closure and stabilization of the disposal site so that following transfer of the disposal site to the site owner,² the need for ongoing active maintenance is eliminated to the extent practicable and only minor custodial care, surveillance, and monitoring are required. These assurances shall be based on Director approved cost estimates reflecting the Director approved plan for disposal site closure and stabilization. The applicant's cost estimates shall take into account total costs that would be incurred if an independent contractor were hired to perform the closure and stabilization work.

² This means the governmental custodial agency: "Custodial agency" means an agency of the government designated to act on behalf of the government owner of the disposal site. A legally-binding tri-party agreement provides assurance that the DOE will serve as the custodial agency as anticipated by the rules.

R313-25-32. Financial Assurances for Institutional Controls.

(1) Prior to the issuance of the license, the applicant shall provide for Director approval, a binding arrangement, between the applicant and the disposal site owner that ensures that sufficient funds will be available to cover the costs of monitoring and required maintenance during the institutional control period. The binding arrangement shall be reviewed annually by the Director to ensure that changes in inflation, technology, and disposal facility operations are reflected in the arrangements.

(2) Subsequent changes to the binding arrangement specified in Subsection R313-25-32(1) relevant to institutional control shall be submitted to the Director for prior approval.

This matter presents an unusual situation, not anticipated by the rules, in that disposal operation would be occurring on private property. At this time, there is no provision, legally or financially, for responsibility for depleted uranium following the institutional care period. In addition to the foregoing rules, reference is made to the following:

R313-12-54. Additional Requirements.

The Director may, by order, impose upon a licensee or registrant requirements in addition to those established in these rules that the Director deems appropriate or necessary to minimize any danger to public health and safety or the environment.

This rule is based upon the NRC rule codified at 10 C.F.R. § 20.2302 and provides me with discretion to impose requirements that are deemed necessary to protect public health, safety and the environment. There is concern that the proposal to dispose of significant quantities of concentrated depleted uranium, which is presently owned by and in the possession of the DOE, on private property in Utah without some form of legally-binding arrangement for long-term ownership, care and stewardship of the facility and the material, the responsibility for the site will fall, by default, to the citizens of the State of Utah. There is also concern about the adequacy of the perpetual funding that will be required to manage this disposal site in order to comply with the Radiation Control Rules cited above.

Finally, but not least, the requirement for a legally-binding agreement from the DOE is a policy directive mandated by the Governor's Office. As you know, the Governor's Office has required for several years, as a condition for disposal of large quantities of DOE's depleted uranium wastes, that there be a legally-binding agreement for the U.S. Department of Energy to take responsibility for this particular type of waste. The Governor's policy is also consistent with the legal requirements cited above.

II. RECLASSIFICATION OF DEPLETED URANIUM – UTAH PROHIBITION.

While not addressed in the April 2, 2018 letter, there is another issue that was raised in the draft 2015 SER that bears mentioning here. Pursuant to the NRC's SRM-SECY-08-0147 (copy enclosed), the Commission expressly directed staff to "explicitly address the waste classification of depleted uranium." As you know, the Utah Legislature has prohibited the receipt or disposal of any other classes of radioactive waste except Class A waste. The fact that the NRC may yet reclassify depleted uranium places a cloud on the legality of EnergySolutions' proposal. In light of this open issue, the draft 2015 SER indicated that some form of assurance from the NRC would be required in order to move forward with the evaluation of the application. The former DRC also raised this issue to EnergySolutions as far back as 2013. In light of the current situation as the NRC, there does not appear to be an imminent resolution to this question.

On a related topic, there is also an important legal question as to the scope and meaning of the Radiation Control Act's prohibition on the receipt and disposal of wastes except for Class A waste. Because of ingrowth, depleted uranium activity levels, and consequently concentration, will eventually exceed the concentrations applicable to Class C waste limits. On the other hand, under federal law, waste is classified at the time of disposal. The Division is not satisfied that federal law is dispositive as to whether the Utah Code's prohibition means at the time of disposal only or at any time. The Legislature made a policy directive that it believed was in the best interest of the citizens of the State of Utah. The apparent intent was to keep out higher classes of waste. As illustrated in the NRC's slide above and Attachment A, the long-term stewardship issues and monitoring costs associated with concentrated depleted uranium are different than other forms of Class A waste. Its radioactivity levels will inevitably exceed those associated with Class C waste. This issue has never been judicially determined nor has the Legislature attempted to clarify the meaning of its policy directive as stated in the statute. The uncertainty of the meaning and interpretation of the Radiation Control Act also gives some pause to the evaluation of EnergySolutions' proposal to dispose of large quantities of concentrated depleted uranium at Clive.

In conclusion, the Division's continuing technical review of EnergySolutions' responses to the Amended and New Interrogatories may serve no purpose until the foregoing issues are resolved, namely: (1) the DOE agrees, in a legally-binding manner, to become the long-term governmental custodial agency; (2) the NRC makes a final determination as to its classification of depleted uranium; and (3) the meaning of the Utah prohibition on the disposal of higher classes of waste is clarified. Until these issues are addressed, it will not be possible to release a final SER that determines whether the proposed disposal of large quantities of concentrated depleted uranium is in compliance with Utah law. In the event that EnergySolutions would like the Division to continue its technical review, including the use of outside consultants, notwithstanding the foregoing reservations, please let me know.

If you have any questions, please call Bret F. Randall at (801) 536-0284 or Don Verbica at (801) 536-0206.

Sincerely,



Scott T. Anderson, Director
Division of Waste Management and Radiation Control

STA/BFR/km

c: Jeff Coombs, EHS, Health Officer, Tooele County Health Department
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Bret F. Randall, Attorney General's Office

ATTACHMENT A

NRC Statements Concerning Depleted Uranium, Its Classification, and Its Long-Term Risk

“We are concerned, though, that the Board (and the underlying FEIS) may not have fully explored potential long-term effects from disposing of depleted uranium – whose radiological hazard gradually increases over time.” (NRC, 2006, Page 3)

“It has been and continues to be the Staff’s position that ‘some near-surface disposal facilities may not be suitable for large quantities of depleted uranium from uranium enrichment operations’ because established radiological standards could be exceeded.” (NRC, 2006)

“Because of the unique characteristics of the waste and the additional considerations required for its disposal, staff concluded that existing regulations need to be amended to ensure that large quantities of DU are disposed of safely.” (NRC, SECY-2008-0147, Page 2)

“The licensing of new uranium enrichment facilities in the United States has brought DU to the forefront of low-level waste (LLW) disposal issues. The DU waste stream is unique; the relatively high concentrations and large quantities of DU that are generated by enrichment facilities were not considered in the Final Environmental Impact Statement (FEIS) supporting the development of 10 CFR Part 61.¹ When the FEIS was issued in 1982, there were no commercial facilities generating large amounts of DU waste, therefore, the FEIS considered only the types of uranium-bearing waste streams being typically disposed of by U.S. Nuclear Regulatory Commission (NRC) licensees at the time.² The NRC concluded that those waste streams posed an insufficient hazard to warrant establishing a concentration limit for uranium in the waste classification tables in 10 CFR 61.” (NRC, SECY-2008-0147, Page 2)

“For similar disposal conditions, the peak risk (at 2 million years) from radon from DU is orders of magnitude larger than from uranium mill tailings. However, even after 1,000 years, if the radon barrier

is lost (meaning that the institutional controls had failed), radon hazards at uranium mill tailings impoundments would likely produce doses to intruders that exceed 500 millirem/yr, the intruder dose objective used in the development of the Part 61 waste classification system (NUREG-0706, Final Generic EIS on Uranium Milling, September 1980). Therefore, the staff concluded that specific and unique guidance was needed for disposal of large quantities of DU in LLW facilities to mitigate the potential impacts to the intruder.” (NRC, SECY-2008-0147, Page 4)

“Staff believes that a change to existing regulations or a generic communication is necessary to ensure large quantities of DU are disposed of safely.” (NRC, SECY-2008-0147, Page 5)

“Because small quantities and lower concentrations of uranium were considered in the FEIS, staff believes there is no benefit to changing the existing classification for small quantities of DU in § 61.55(a)(6). It is the large quantities and higher concentration of DU that create a potential health and safety concern, and staff believes that the goal of any changes to Part 61 should be to provide a means to ensure additional disposal considerations are taken for DU, based on the quantity of material at issue. A site-specific analysis is a risk-informed mechanism to understand potential impacts from the type and quantity of material being disposed, accounting for the unique site characteristics present at the receiving disposal facility. Specific technical requirements for how to perform this site-specific analysis would ensure it is consistent with the analysis performed to develop the waste classification tables in § 61.55, which would result in a standard that is as protective of health and safety as a generic waste classification for DU.” (NRC, SECY-2008-0147, Page 7)

“Similarly, staff intends to define “large quantities” of DU in the rule language as quantities similar to those being generated at uranium enrichment facilities.” (NRC, SECY-2008-0147, Page 8)

“Depleted uranium has some characteristics that are dissimilar from commercial LLW.

- A large percentage of the activity is associated with very long-lived radionuclides.
- Radioactive decay results in increasing hazard with time until after 1 million years, as a result of increasing concentrations (and higher mobility) of decay products.
- In-growth of significant quantities of a daughter in gaseous form (222Rn))”

(NRC, SECY-2008-0147, Enclosure 1, Pages i and ii)

“Near-surface disposal (i.e., less than 30 meters [m], as defined in Part 61) may be appropriate for large quantities of DU under certain conditions. However, unfavorable site conditions can result in the performance objectives not being met.” (NRC, SECY-2008-0147, Enclosure 1, Page ii)

“The original development of Part 61 did not explicitly consider a waste stream involving the large amounts of DU that has ensued from the operation of a commercial uranium enrichment facility (NRC, 1981). Therefore, the Commission directed the staff to consider whether the quantities of DU in the waste stream from uranium enrichment facilities warrant amending the waste classification tables in Part 61 (NRC, 2005). The nature of the radiological hazards associated with DU presents challenges to the estimation of long-term effects from its disposal – namely that its radiological hazard gradually increases due to the ingrowth of decay products, eventually peaking after 1 million years, rather than decreasing significantly over a few hundred years like that of typical LLW.” (NRC, SECY-2008-0147, Enclosure 1, Page 1)

“Depleted uranium oxide contains approximately 85 percent uranium by mass. In comparison, a low-grade uranium ore common in the United States may contain 0.1 percent uranium by mass.” (NRC, SECY-2008-0147, Enclosure 1, Page 2)

“Peak activity, assuming no release from the source, would not be attained until after 1 million years after disposal. The ratio for DU shown in Figure 1 is determined by the number of daughter radionuclides represented in the decay chain, because the daughter radionuclides are in secular equilibrium with the long-lived parents for long periods of time. In addition, the activity of some risk significant radionuclides (*e.g.*, ^{222}Rn , ^{210}Pb) increase by a much more significant amount than the overall activity. The activity of ^{222}Rn and ^{210}Pb in particular increase by more than a factor of 1,000 between 1,000 years to 1 million years after disposal. Because different elements can have different mobility and radiotoxicity, total activity cannot be directly translated to risk (dose). As a result of these characteristics of the source term, assessment of the risk of DU disposal in the near-surface requires an evaluation of a number of different features, events, and processes over timeframes that could be substantial.” (NRC, SECY-2008-0147, Enclosure 1, Page 3)

“The types and degree of constraints would be different for disposal of large quantities of DU in the near-surface compared to typical LLW.” (NRC, SECY-2008-0147, Enclosure 1, Page 21)

“The characteristics of DU differ from commercial LLW. As shown in Figure 1, the radiologic hazard of DU is more persistent than typical commercial LLW. It also has a much lower initial specific activity compared to its eventual specific activity.” (NRC, SECY-2008-0147, Enclosure 1, Page 21)

“DU requires a greater consideration of long-term stability and isolation from the accessible environment over longer timeframes.” (NRC, SECY-2008-0147, Enclosure 1, Page 21)

“Under improper disposal systems, configurations, or unfavorable site conditions, disposal of significant quantities of DU can exceed the 10 CFR 61.41 and 10 CFR 61.42 performance objectives by a significant margin.” (NRC, SECY-2008-0147, Enclosure 1, Pages 21, 22)

“DU that contains significant quantities of long-lived radionuclides may pose a long-term risk to the public due to the ingrowth of progeny.” (NRC, 2016, Page 2-4)

“Licensees should consider the impacts of significant progeny on the intruder. Radioactive decay can result in significant ingrowth of progeny at future times. For example, activities from depleted uranium may increase for more than one million years due to ingrowth of shorter-lived and more highly mobile decay products.” (NRC, 2016, Page 4-26)

“The waste concentration limits in 10 CFR 61.55 may not be adequately protective for certain waste streams containing long-lived radionuclides that are classified as Class A by default because concentration limits were not developed (e.g., depleted uranium) for those long-lived radionuclides. Class A waste is considered relatively innocuous because it usually contains the types and quantities of radionuclides that will decay during the first 100 years and will present an acceptable hazard to an inadvertent intruder. Regardless of the method proposed to develop allowable limits for specific radionuclides, a licensee must conduct technical analyses to demonstrate that the performance objectives will be met. The guidance in Section 8.1.1.2 acknowledges that it may be possible that limits on radionuclides that are not listed in the waste concentration limits in 10 CFR 61.55 may need to be

developed for some disposal facilities. As discussed in Section 8.1.1.2, the technical analyses would be used to identify whether limits beyond those in 10 CFR 61.55 would be needed.” (NRC, 2016, Pages F-36, F-37; see also F-62.)

REFERENCES

Nuclear Regulatory Commission (NRC) (2006) CLI-06-15, MEMORANDUM AND ORDER, In the Matter of LOUISIANA ENERGY SERVICES, L.P., National Enrichment Facility, Docket No. 70-3103-ML.

Nuclear Regulatory Commission (NRC) (2008) SECY-2008-0147. RULEMAKING ISSUE (NOTATION VOTE), October 7, 2008, FOR: The Commissioners, FROM: R. W. Borchardt Executive Director for Operations, SUBJECT: RESPONSE TO COMMISSION ORDER CLI-05-20 REGARDING DEPLETED URANIUM .

Nuclear Regulatory Commission (NRC) (2016) Guidance for Conducting Technical Analyses for 10 CFR Part 61 DRAFT Final Report, October 2016, written by Esh, D., Grossman, C. Arlt, H., Barr, C., and Yadav, P.